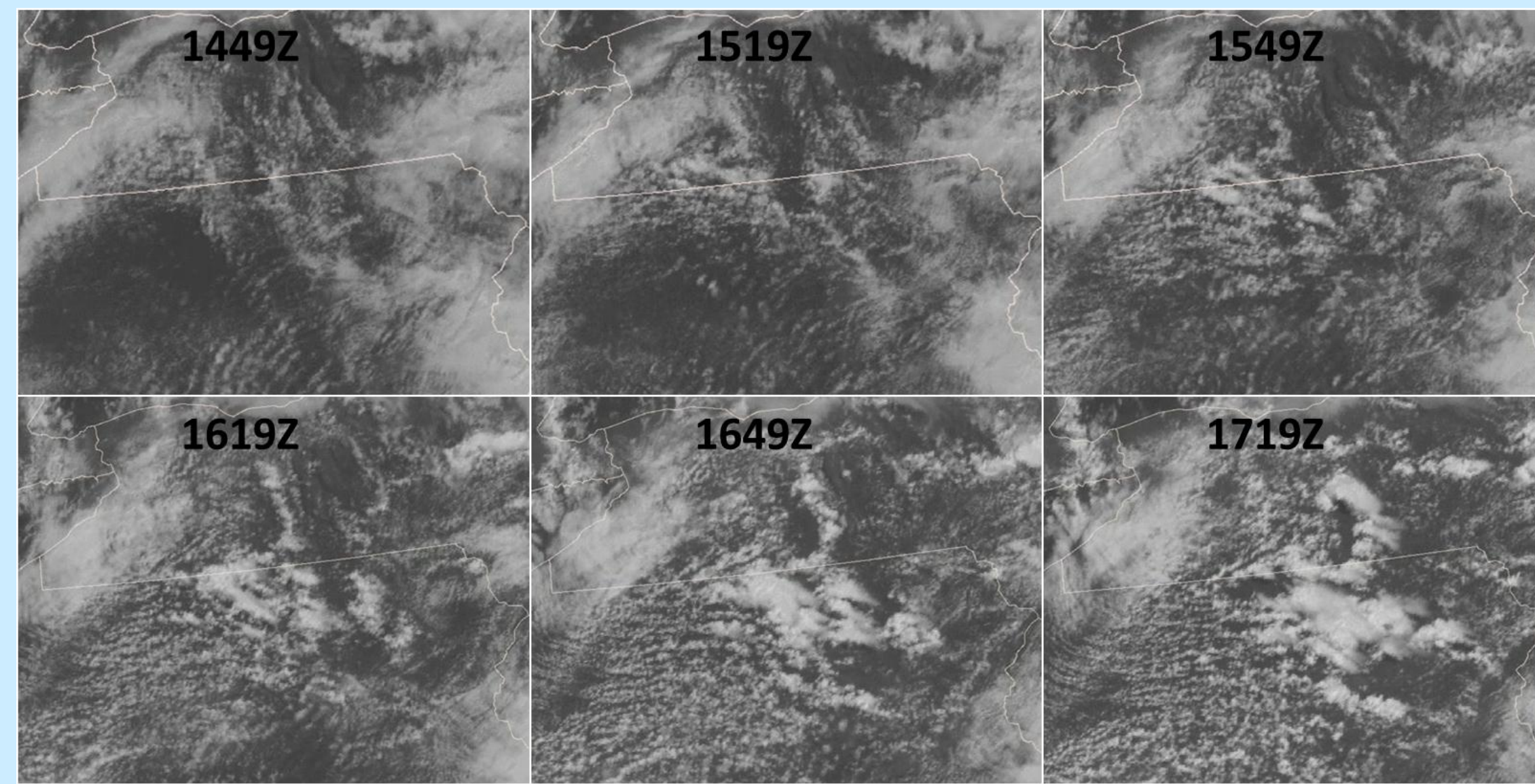


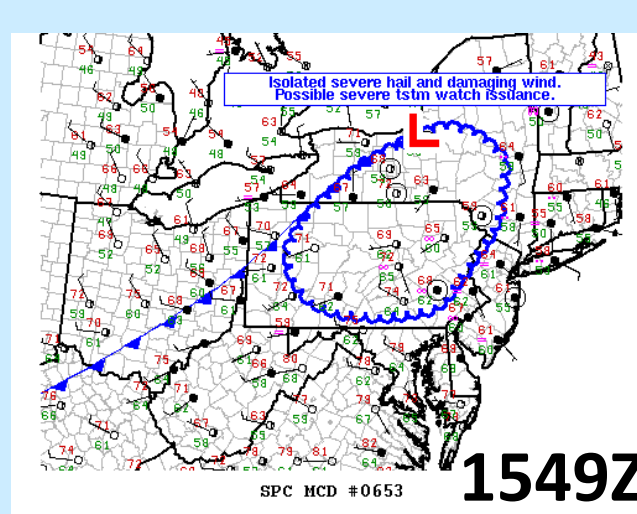
Bill Line

University of Oklahoma – CIMMS and NOAA/NWS/Storm Prediction Center, Norman, OK

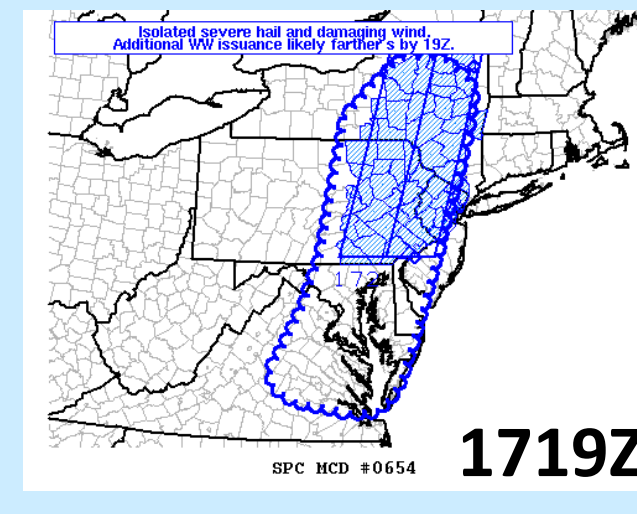
May 22, 2014



"1-MIN RESOLUTION VISIBLE SATELLITE IMAGERY DEPICTS DEEPENING CU AND SMALL CBS FORMING ALONG/JUST AHEAD OF A COLD FRONT STRETCHING FROM AROUND 25 S ROC TO ZZW...WITH THE GREATEST CLUMPING NEAR THE NY/PA BORDER." – From SPC MD

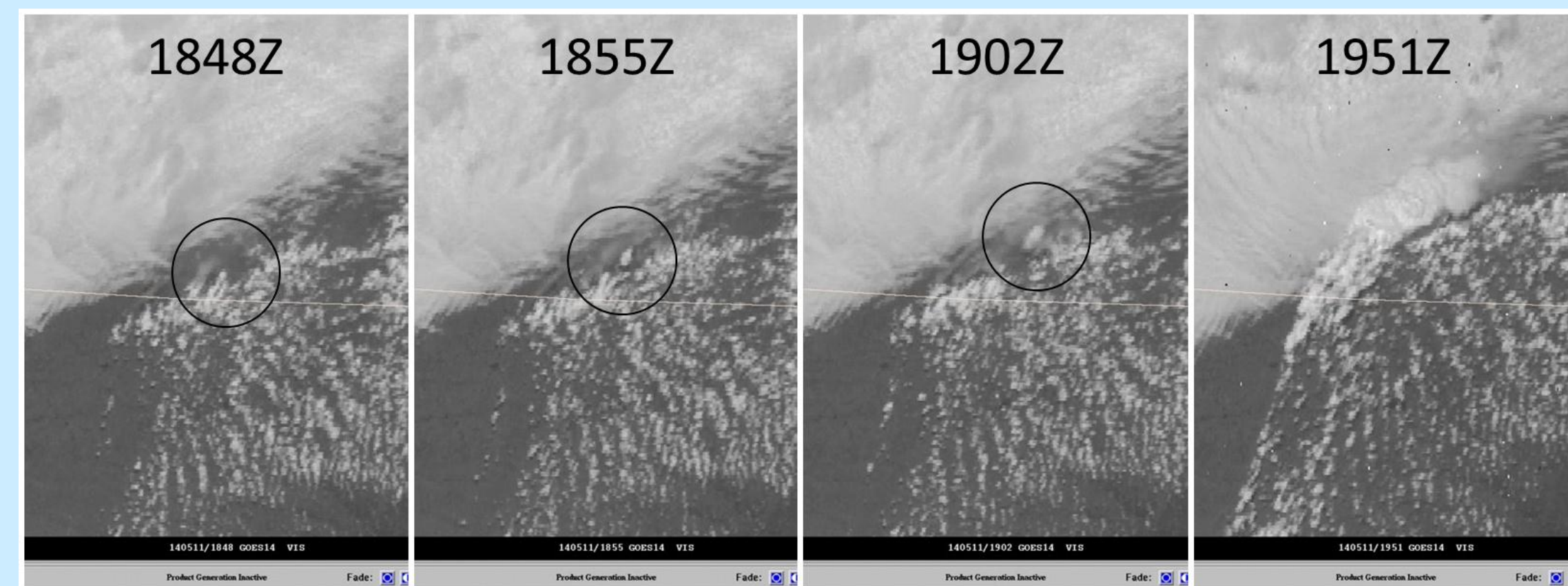


"AREAS OF CLUMPING CU EVIDENT IN 1-MIN RESOLUTION VISIBLE IMAGERY FROM S-CNTRL PA TO CNTRL VA SHOULD EVOLVE INTO ISOLATED TO SCATTERED STORMS BY 19-20Z...LARGELY SUPPORTED BY CONVECTION-ALLOWING GUIDANCE." – From SPC MD

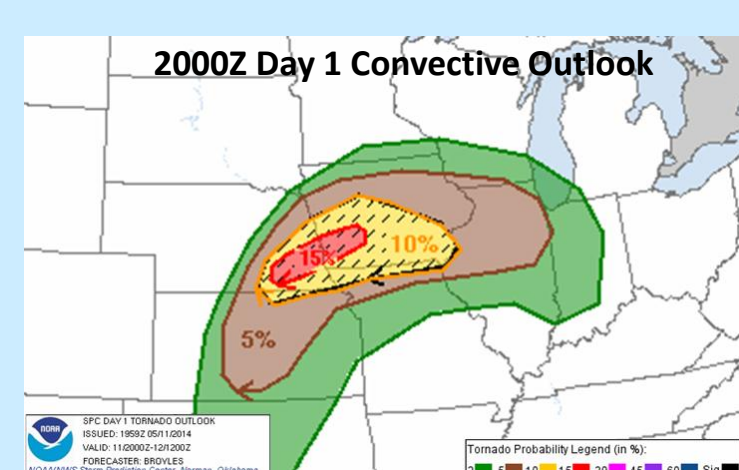


- "With weakly forced, nebulous low-level boundaries over the Northeast today, the ability to see where boundary layer cumulus is deepening and clumping in this manner is quite striking." – *SPC Forecaster on shift*
- "The 1-min imagery increased confidence and lead time for the issuance of two mesoscale discussions compared to the normal satellite update frequency/latency." – *SPC Forecaster on shift*
- "The 1-min satellite imagery has afforded opportunity to more completely observe life cycles of individual convective updrafts." – *SPC Forecaster*

May 11, 2014



"THE LATEST 1 KM VISIBLE SATELLITE IMAGERY SUGGESTS STORM INITIATION IS TAKING PLACE NEAR THE SFC TRIPLE POINT IN WEBSTER COUNTY NEB." – From SPC Outlooks

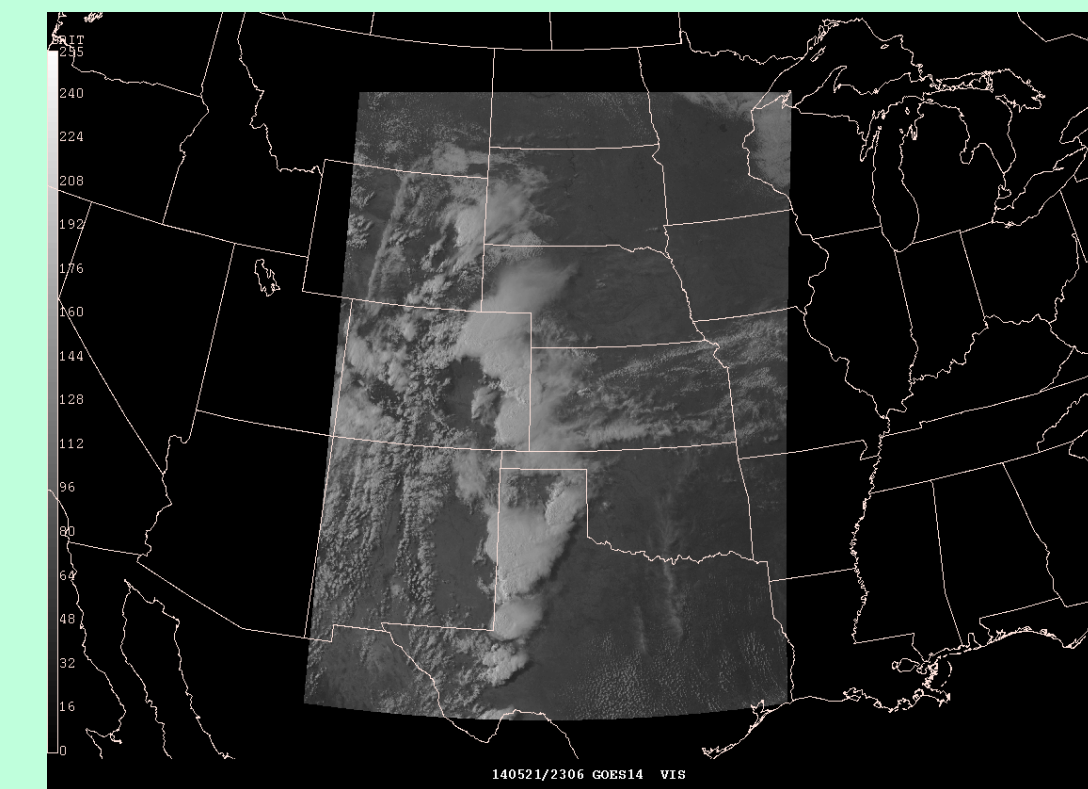


- 1-min visible imagery aided the SPC forecaster at the outlook desk during preparation of the 2000Z Day 1 Convective Outlook.
- "An orphan anvil was generated and blew off of an updraft, providing a clue that a storm was about to initiate. The [GOES-East RSO] data did not provide us this information." – *SPC Forecaster on shift*
- Although the tornado probabilities would have likely been increased without it, the 1-min imagery did increase confidence in the decision to make the upgrade and where.
- "Increased temporal resolution of scans allows forecasters to identify key mesoscale features relevant to severe convection, including convective initiation, location and movement of boundaries, and thunderstorm evolution." – *SPC Forecaster*

Background

- Geostationary satellite imagery is a vital component to the success of the SPC mission.
- The Geostationary Operational Environmental Satellite R-Series (GOES-R) Advanced Baseline Imager (ABI), when in Flex Mode (Mode 3), will provide a full disk scan every 15 minutes, a CONUS scan every 5 minutes, and 30-second imagery over one mesoscale sector (nominally 1000 km x 1000 km at the satellite sub-point) or 1-minute imagery over two mesoscale sectors.

| | ABI | Current |
|---|--------------|--------------------|
| Spectral Coverage | 16 bands | 5 bands |
| Spatial resolution | | |
| 0.64 μ m Visible | 0.5 km | Approx. 1 km |
| Other Visible/near-IR Bands ($>2 \mu$ m) | 1.0 km | n/a |
| | 2 km | Approx. 4 km |
| Spatial coverage | | |
| Full disk | 4 per hour | Scheduled (3 hrly) |
| CONUS | 12 per hour | ~4 per hour |
| Mesoscale | Every 30 sec | n/a |



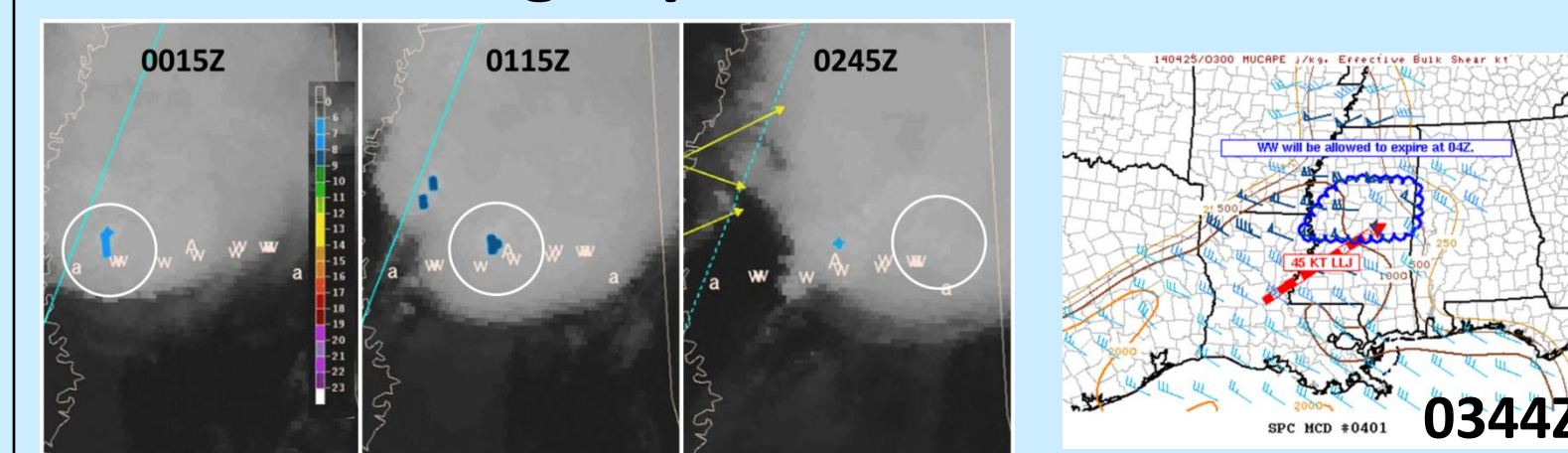
Example mesoscale sector from May 21, 2014

- GOES-14 was operated by NOAA in an experimental rapid scan 1-minute mode during parts of 2012, 2013 and 2014.
- The 1-min imagery was formatted for display in the SPC NAWIPS system and was utilized heavily in SPC operations during parts of August 2013, May 2014, and August 2014.
- SPC forecasters took note of specific features and processes observed in the 1-min imagery that were less obvious or not apparent at all in the corresponding routine geostationary satellite imagery.
- The benefits of the 1-min imagery to SPC operations were realized during all parts of the convective nowcast cycle, including pre- and post-convective initiation.

Benefit to Algorithms

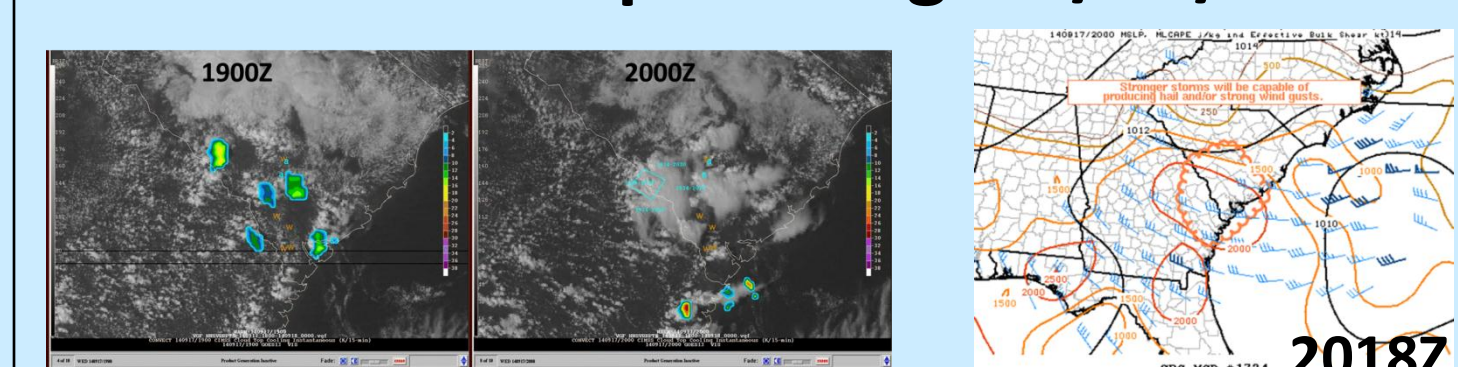
The higher temporal (and spatial/spectral) resolution satellite data will lead to improved/enhanced algorithms.

Overshooting Top Detection – 4/24/14



"THE GOES-R OVERSHOOTING TOP PRODUCT INDICATED A DIMINISHING TREND OVER EAST CENTRAL MS SUCH THAT UPDRAFT INTENSITIES ARE LIKELY WEAKENING." – From SPC MD

Cloud Top Cooling – 9/17/14



"THE MODERATE INSTABILITY AND -10 C 500 MB TEMPERATURES ARE PROVING SUFFICIENT FOR RAPID CLOUD TOP COOLING WITH MOST OF THE STORM CELLS IN THIS REGION PER GOES-R CLOUD TOP COOLING PRODUCT." – From SPC MD

Other General Comments

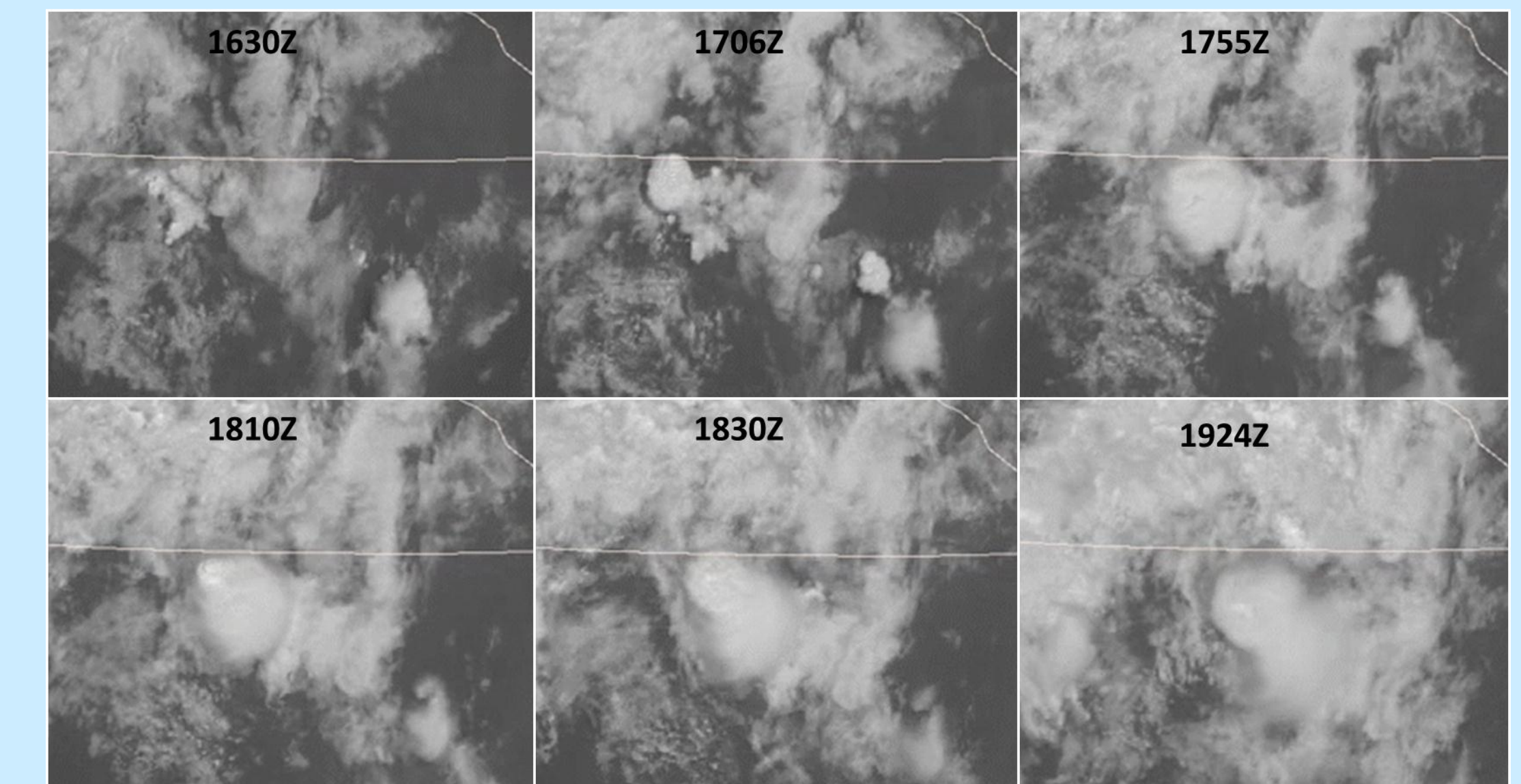
- "The higher spatial resolution of IR imagery will allow more detail in diagnosing convection (especially initiation and early-stage), as well as IR-detectable low-level boundary characteristics, at night." – *SPC Forecaster*
- "... the 1-minute data gives a more continuous depiction of how meteorological features are evolving, versus the "snapshot" approach of coarser temporal resolution images." – *SPC Forecaster*
- "Satellite imagery at 1-min temporal resolution needs to become the new standard for severe weather operations." – *SPC Forecaster*

Acknowledgments

SPC Staff, Steve Goodman (NOAA/NESDIS), Tim Schmit (NOAA/NESDIS), Dan Lindsey (NOAA/NESDIS)

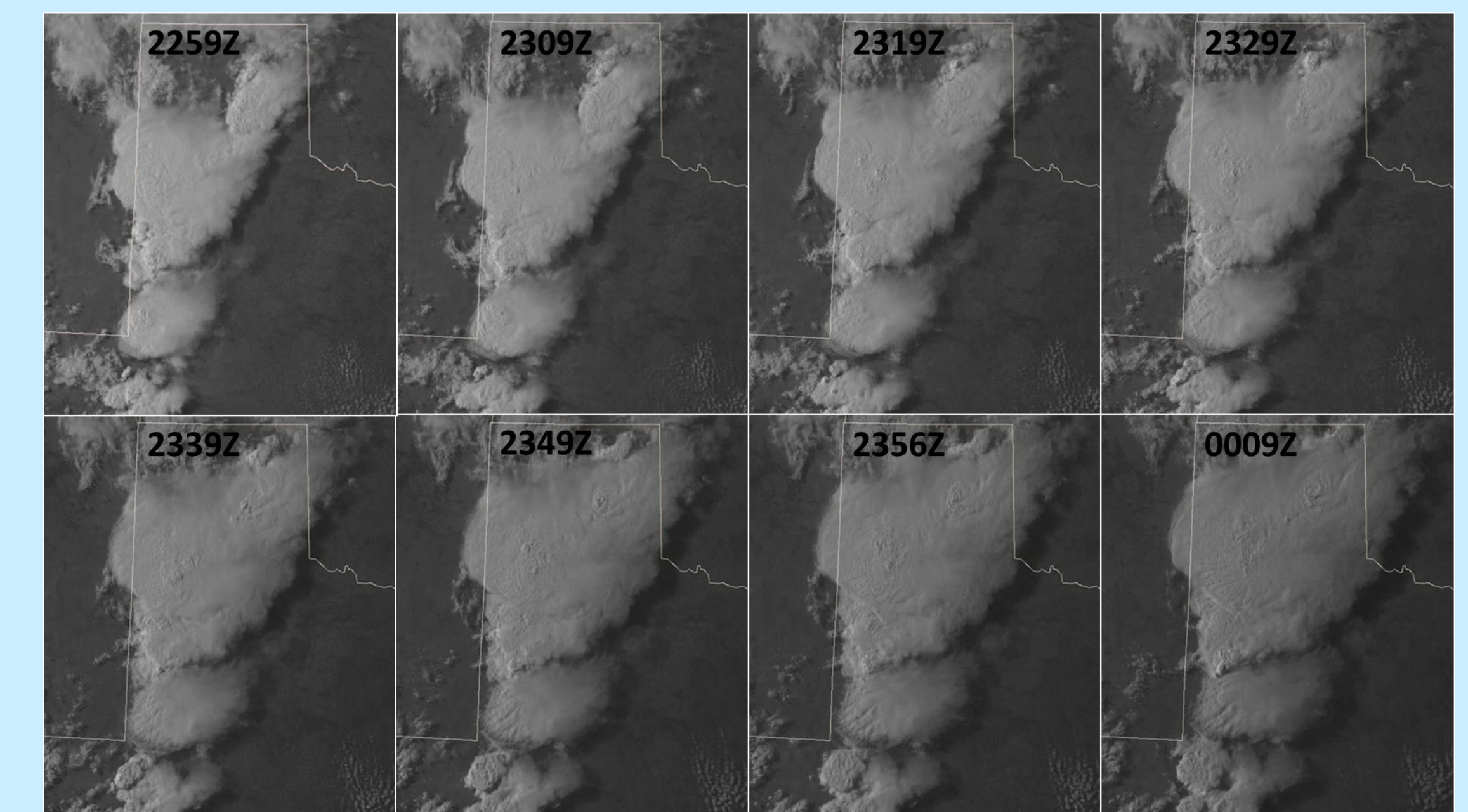
Contact: Bill Line, bill.line@noaa.gov

August 21, 2013

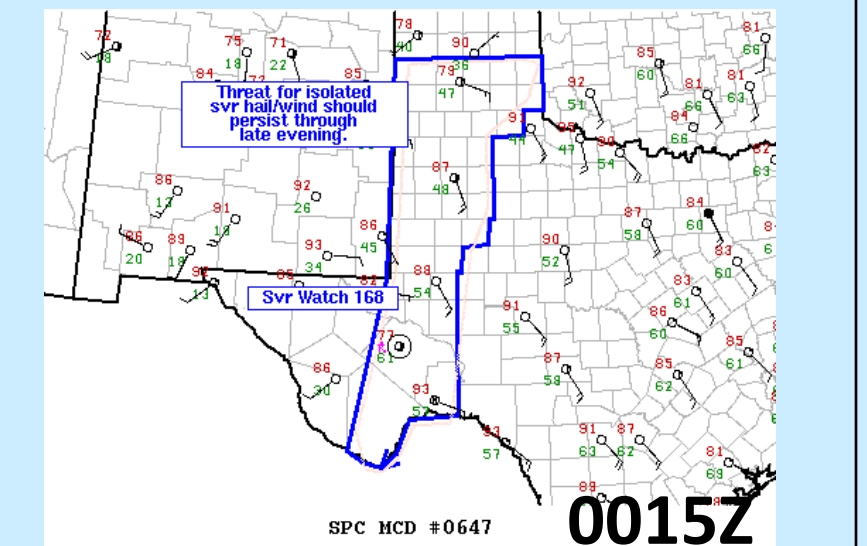


- 1-min visible imagery aided the lead SPC forecaster in monitoring convection in northern Iowa that had developed in a region with a more marginal severe threat.
- The 1-min imagery revealed in real-time that the updrafts developed quickly and then began to weaken. From this, the forecaster recognized (earlier than was possible from routine imagery) that convection was dissipating, and that these early Iowa storms would not evolve into the main severe event.
- "It provided an enhanced view of cloud structure and evolution that helped at times to verify what we expected was likely occurring with the clouds, but not viewable in the past." – *SPC Forecaster*

May 21, 2013



"GOES 14 ONE-MINUTE IMAGERY SHOWS CONTINUED UPDRAFT GENERATION WITHIN A MORE MATURE CLUSTER JUST E OF AMA...AND ADDITIONAL TSTM DEVELOPMENT W OF MAF...SUGGESTIVE OF A CONTINUED SVR HAIL/WIND THREAT FOR AT LEAST THE NEXT 1-2 HRS." – From SPC MD



- "Post-storm initiation, the high-resolution data allowed for careful analysis of overshooting and collapsing tops, the character of the storm anvils (ie. health of the storm) and the identification of convectively generated outflows." – *SPC Forecaster*
- "As deep convection encounters capping inversions, the spreading out of the convection can be seen. This may enhance our ability to assess capping strength with more experience." – *SPC Forecaster*
- "Flanking line convection is also clearly evident in the short time scans. Usually, this development is hard to visualize in longer time spans since anvil clouds often obscure this type of evolution rather quickly." – *SPC Forecaster*